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## General Articles.

### The Tuberculin Test in Cattle.*

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There have been so many papers written and so many discussions on the symptoms, prevalence, post-mortem appearances, and diagnosis of tuberculosis for many years past, that it may seem that a paper on the tuberculin test is much too worn a subject for me to bring forward for discussion before this meeting.

Just previous to the war there was a big movement by those interested in public health to reduce the amount of tuberculous milk and meat in this country.

The Tuberculosis Order was a genuine progressive step in this direction. At the present time the minds of the Public Health Authorities are directed towards the same goal, and no doubt in the near future we shall have a modified Tuberculosis Order re-introduced, the aim of which shall be the further eradication of tuberculosis from our cattle.

I think the time is not far distant when our profession will be called upon to undertake much of the work in connection with the eradication of tuberculosis throughout the country, and for this reason I thought a discussion on the tuberculin test would not be considered out of place.

For many years the testing of herds for tuberculosis has formed part of my work. I consider it an important work, and one which I think is very much on the increase.

Cattle are maintained in this country for the production of meat and milk, both of which form an important part of the food of man, milk more particularly being the diet of young children and invalids.

*Necessity for eradication.*—It is a well-known and admitted fact that both milk and meat may act as the carrier of diseases, including tuberculosis, to human beings; that being so, it should be our aim and duty to adopt such measures that will tend to reduce the amount of tuberculosis in our cattle herds. Tuberculosis of cattle, in view of its retarding effect on the production of meat and milk, is each year becoming increasingly serious from the standpoint of national economy.

As its presence among our cattle must necessarily exact an unfavourable influence upon the production of meat and milk, it must by decreasing the output increase the cost of those foods; further there is the direct financial loss to the agriculturist and cowkeepers.

The eradication of bovine tuberculosis is desirable for the following reasons:—

1. In the interest of public health for the removal of a possible source of infection for human beings.
2. For the increase of our home meat and milk supply.
3. For national and agricultural economical reasons and the establishment of tubercle-free pure-breed cattle.

Many cattle owners object to the tuberculin test, and say they do not believe in it. This opinion of the reliability of the test may seem unwarranted, yet on making searching inquiries we usually find that their judgment is based on unscientific expressions of opinions by the misinformed. It is frequently asserted by cattle owners that perfectly healthy cows give a reaction, and as I have found that opinion was based on the assertion of the handy-man who acted as temporary butcher, and who dressed the carcase and declared it was perfectly healthy. It is only on such ignorant, unscientific opinions that the reliability of the tuberculin test nowadays is ever questioned.

*Percentage of animals affected with Tuberculosis.*—It is a well-established fact known to those who are accustomed to testing large numbers of cattle for tuberculosis (especially cattle in herds which have not been previously tested) that a high percentage of our bovine population, and particularly the more mature animals found in our dairy herds, are affected with tuberculosis.

As only a comparatively small percentage of our herds are being tested for tuberculosis, we have no statistics affecting the whole of the country which one could produce to illustrate the extent to which our cattle are affected with this disease, but from time to time we see published the experience of different authorities which indicate the prevalence of tuberculosis among the cattle in their own particular district. In 1907 the Birmingham Corporation introduced a scheme offering to test free of charge the herds of cowkeepers who

* Address delivered at the Conference of Veterinary Inspectors, held in conjunction with the Royal Sanitary Institute at Folkestone, June, 1921.

were supplying milk to the city. I will not go into details of the scheme here, but mention it in connection with the prevalence of tuberculosis in our district. Of the first twenty herds which were tested for the first time, the following table shows the percentage of affected animals as indicated by the test :—

TABLE 1.

| Herd No. | Animals tested. | Passed. | Doubtful. | Reacted. | Percentage affected. |
|---|---|---|---|---|---|
| 1 | 33 | 15 | 5 | 13 | 39·3 |
| 2 | 18 | 8 | 1 | 9 | 50 |
| 3 | 33 | 18 | 2 | 13 | 39·3 |
| 4 | 16 | 12 | 1 | 3 | 18·8 |
| 5 | 13 | 13 | — | — | — |
| 6 | 52 | 20 | 2 | 30 | 57·7 |
| 7 | 43 | 24 | 4 | 15 | 34·9 |
| 8 | 45 | 7 | 1 | 37 | 82·2 |
| 9 | 11 | 9 | 1 | 1 | 9·1 |
| 10 | 9 | 7 | — | 2 | 22·2 |
| 11 | 47 | 21 | — | 26 | 55·3 |
| 12 | 47 | 40 | — | 7 | — |
| 13 | 25 | 8 | 2 | 15 | 60 |
| 14 | 19 | 17 | — | 2 | 10·5 |
| 15 | 40 | 36 | — | 4 | 10 |
| 16 | 37 | 18 | — | 19 | 51·3 |
| 17 | 72 | 55 | 4 | 13 | 18 |
| 18 | 36 | 12 | — | 24 | 66·6 |
| 19 | 27 | 9 | 7 | 11 | 40·7 |
| 20 | 53 | 39 | — | 14 | 26·4 |
| | 676 | 388 | 30 | 258 | 38·2 |

From the above table it will be seen that on an average of the twenty herds tested, 38·2 per cent. gave a reaction, indicating they were affected with tuberculosis. To assume that this is the average percentage of tuberculosis in all the dairy herds supplying milk to Birmingham would, in my opinion, be taking a too favourable view of the existing conditions either in Birmingham or other similar centres in this country.

I have found that cowkeepers who are anxious to procure tubercle-free herds do not relax their efforts in other directions to maintain a good standard in their herds. All the herds mentioned in the table were kept under hygienic conditions, and previous to the introduction of the testing the animals were carefully selected and all suspicious ones disposed of ; therefore under these circumstances it would be reasonable to suppose that the percentage of reactors found in the above herds is lower than would be found on a general testing of all the dairy herds in our district, hence one cannot state definitely the percentage of reactors in any one district, but one is, I think, justified in asserting that the percentage of tuberculous animals among dairy herds generally is at least 38·2 per cent. or over.

It is a significant fact that the animals in the herds Nos. 5 and 9, which show such a low percentage of reactors as compared with the other herds tested, were mostly young animals with the first or second calf, and in the case of No. 14, the herd had previously been kept out of doors all the year round.

*Diagnosis.*—Cattle may be affected with tuberculosis in a varying degree without exhibiting any visible evidence. Except in the more advanced cases of tuberculosis, it is not possible in the majority of cases to diagnose the disease without having recourse to the bacteriological, inoculation, or tuberculin tests.

In the bacteriological test discharges from all the natural orifices of an infected animal may be examined and yet give negative results. Similar discharges may be used for inoculation ; this is a more certain method than the microscopical, yet may fail where the more searching test with tuberculin will succeed.

Animals which are affected with tuberculosis may for a short period during the early development of the disease be non-infective to others, but they soon become distributors of living tubercle bacilli, and are then a source of danger to tubercle, free animals which are in contact with them. It is my opinion that all cases of tuberculosis in cattle should be considered as "open cases." The disease in cattle does not as a rule run a rapid course, it becomes chronic ; but being a disease it must naturally have a lowering effect on the animal organism, and thereby affect the meat and milk-producing capacity of the animal, which, under those circumstances, would require more care and food to produce the same amount of milk and meat than they would have done had they been tubercle free ; therefore it is economically sound to maintain tubercle-free herds.

Having assumed that the eradication of tuberculosis is not only desirable but necessary, the first obvious step is to establish a simple, practical, and reliable system of diagnosis. We have in tuberculin an agent which will fulfil these demands when properly prepared and carefully used by trained persons.

*Tuberculin.*—Tuberculin is a glycerine broth culture of the tubercle bacillus. It is heated, filtered and then evaporated to reduce to concentrated form, and is sold on the market either concentrated or diluted. It is more commonly sold in the diluted form ready for use. The concentrated form requires dilution with nine times its volume of 5 per cent. carbolic acid in water.

The dose of the diluted tuberculin when used subcutaneously is 3-4 cc. for an adult bovine. If 5 or 6 cc. is given, it does not in ordinary cases have a different effect than 3 cc. would have on a healthy animal.

The tuberculin test may be applied in several ways :—

1. The ophthalmic method ;
2. The intradermal method ;
3. The subcutaneous method.

*The Ophthalmic Method.*—The ophthalmic test is carried out with a special tuberculin—Calmette's tuberculin. This is a concentrated alcoholic precipitate of tuberculin ; it contains no carbolic acid or other irritant likely to affect the conjunctiva of a healthy animal. It produces in tuber-

culous animals a well-marked conjunctival inflammation when applied to the eye-ball. A few drops are dropped on to the cornea from a glass rod or by soaking a camel hair brush in the tuberculin, and allowing the brush to rest on the cornea; the animal closes the eye, and the brush is then withdrawn, leaving the tuberculin on the cornea. One eye only being done, the other eye acts as a control. In the case of a reaction, watering of the eye will be noticed five to ten hoars after the application of the tuberculin. This is followed by an acute congestion of the conjunctiva and a muco-purulent discharge, which persists for twenty-four to thirty-six hours. In the case of non-reactors, where there is a watery discharge due to mechanical irritation, it will be found that this takes place very soon after the application of the tuberculin, and gradually diminishes; not being persistent or followed by a muco-purulent discharge as occurs in the case of a reactor. This method is valuable to use in certain cases in conjunction with the subcutaneous test. The adoption of this method in conjunction with the more common subcutaneous test is known as the combined test.

TABLE NO. 2.

*Combined Test.*

| No. | Description. | Subcutaneous Test Temperatures. Initial. | 9th. | 12th. | 15th. | 18th. | Result. | Ophthalmic test |
|---|---|---|---|---|---|---|---|---|
| 1 | Hereford ... | 102 | 101·6 | 101·8 | 101·8 | 102 | Free | Negative |
| 2 | Roan shorthorn | 101·8 | 101 | 101·2 | 101·2 | 101 | ,, | ,, |
| 3 | Yellow cow ... | 101·6 | 101 | 101 | 100·8 | 101 | ,, | ,, |
| 4 | Roan cow ... | 101·4 | 101 | 101 | 101 | 100·8 | ,, | ,, |
| 5 | Hereford ... | 102 | 101·4 | 101·8 | 103 | 104·2 | Reactor | Positive |
| 6 | White cow ... | 102 | 103 | 105·6 | 104·4 | 103 | ,, | ,, |
| | | | | | | | Watery discharge & later all right muco-purulent discharge. The two reactors were unmistakably affected in the eyes which were treated. | |

*The Combined Test.*—In order to get the full benefit of the combined test, the ophthalmic test should be first carried out, and about 4-7 days later the animal should be tested by the subcutaneous method. This second part of the combined test should not be carried out until the eye is normal. In the case of a tuberculous animal the eye will again react irrespective of a temperature reaction or otherwise.

This is a valuable test for animals which have recently been tested previous to sale and do not react in the ordinary way.

*The Intradermal Test.*—This may be carried out by rubbing the tuberculin into an area of skin previously shaved and scarified or by injecting with a special small syringe into one of the folds of skin formed by raising the tail well above the level of the back. Reacting animals exhibit a swelling at the site of operation from the 24th to the 48th hour following the injection. The most practical form of tuberculin testing, especially on a large scale, is by the subcutaneous method, and this is the method which is most commonly used.

*Precautions before employing the subcutaneous test.*—Before testing cattle it is necessary in order to make the test a success to observe certain precautions. The internal temperature exhibited by the animal following the injection of the tuberculin is the basis on which the decision is given, whether the animal is affected with tuberculosis or not. Therefore it is most necessary to take particular care that the animal's temperature is not influenced by other conditions. Animals suffering from or very recently recovered from any acute disease should not be tested; similarly animals that are lame or those that are within a short period of parturition, or have recently calved or not cleansed. An interval of several days should elapse before testing animals which have been on a long railway journey, or any other condition which is likely to temporarily upset the temperature. Animals under six months old should not be submitted to the test, their temperatures at this age being more easily modified by other influences than in older animals. Animals exhibit a considerable variation in temperature; and for the purpose of getting an accurate diagnosis, one must as far as possible inject the tuberculin at a period when the animal's temperature is least likely to be affected by other influences.

Animals at grass brought suddenly into a byre and tied up are not fit subjects for tuberculin testing until they have been housed a few days and have settled down to their surroundings; similarly animals undergoing the test should not be turned out until the final temperatures are taken. The testing of animals in œstrum or those with a temperature of 103° F. or over should be postponed until their temperatures have become normal.

Tuberculin which has been in store for a considerable time should not be used; it should be obtained fresh from a reliable source.

I have experimented with various makes and kinds of tuberculin, both English and foreign. We practically always use that obtained from the Royal Veterinary College, London. We have tried all makes obtainable with a view to discovering if any one particular brand possesses any advantages over the others. We have found very little, if any, difference in their effect on cattle.

Tuberculin, like other vaccines, is most reliable as a diagnostic agent when prepared from the same species of bacillus that causes the particular disease. Consequently tuberculin prepared from a particular animal will give a more definite reaction in that animal than in others; and on the same lines I would deduce that tuberculin will be better as a diagnostic agent in the country of its origin than in another country. I mean to say that the nearer related the bacillus causing the disease and the bacillus from which the tuberculin is prepared, the more certain the reliability of the test.

For accurate testing it is advisable to take the temperature eight hours, four hours, and immediately before injecting the tuberculin, and every

two hours from the ninth to the eighteenth hour following the injection. The temperature before injection shows if the animal is normal, and by taking the temperature at the times stated after the injection the true temperature curve can be written. Animals in which the temperature rises gradually from the normal up to 104° F. or more may be considered tuberculous, while those animals in which the temperature rises to 103° F. should be considered doubtful, and should be re-tested a month later. The gradual rise in temperature following the injection of the tuberculin is seen only in the injected animal, and the fall in the temperature is, like the rise, gradual also. The temperature reaches its highest point about the fifteenth hour. A very small percentage of animals come within the doubtful category.

In my experience I have always found that the great majority of cases which give an indefinite or doubtful reaction usually prove reactors later. Where an attempt is being made to free a herd, it is a safe policy to separate your tubercle-free animals from those that have shown a stain of a reaction, even though it is a doubtful one.

Reactors may occur in which the highest temperature recorded is below 104° F. Some animals have continuously an abnormally low temperature. Occasionally animals are met with which have a fairly constant temperature of about 99 to 99·5° F. If the temperature of such an animal rose gradually to 103° F., I would have no hesitation in condemning it as a reactor.

Under certain circumstances, such as the testing of animals on sale subject to passing the test, special care has to be exercised in cases where there is a likelihood of animals having recently undergone the test. We know that the injection of tuberculin will interfere with what might be termed the normal thermal reaction if the animal is subjected to the test too soon after the previous injection of the tuberculin.

The following table shows how one injection of tuberculin will disguise the reaction (if the animal is tested in the ordinary way without taking special precautions) in a later test carried out at too early a date following the first injection.

TABLE 3.

Line A shows the result of the test on May 12th.
Line B shows the result of a further test on June 7th.

| No. | | Initial temperature. | 9th hour. | 12th hour. | 15th hour. | 18th hour. | Result. |
|---|---|---|---|---|---|---|---|
| 786 | A | 102 | 102 | 105·4 | 105 | 105 | X |
| | B | 101 | 100·8 | 101·6 | 103·8 | 101·8 | ?— |
| 787 | A | 101 | 101·4 | 104·8 | 103·6 | 104 | X |
| | B | 101 | 101·2 | 101·6 | 101·6 | 101·8 | — |
| 791 | A | 102 | 102·4 | 106 | 106·4 | 106 | X |
| | B | 102 | 101·8 | 101·6 | 102·2 | 103 | — |
| 840 | A | 101·4 | 101 | 102·2 | 104·2 | 105 | X |
| | B | 101·4 | 101·6 | 101·8 | 102·8 | 102·8 | — |
| 706 | A | 101 | 101·4 | 102·4 | 103·2 | 105·2 | X |
| | B | 101 | 100·8 | 101·4 | 102 | 102·4 | — |
| 797 | A | 101·8 | 102·6 | 104·4 | 104 | 105·6 | X |
| | B | 101·4 | 100·6 | 100·8 | 101 | 101 | — |

The above results clearly show that frequent testing will tend to reduce sensibility of the animal to tuberculin. The results of the above table also clearly indicate how cautious one should be in testing animals that have recently been tested, tampered with or doped for the occasion. In the above table we see the tests on six cows, five of which one would not hesitate to pass free, and one, viz., No. 786, doubtful if the temperature chart of June 7th alone was submitted.

If it is known or suspected that an animal has recently had an injection of tuberculin, it is advisable to increase the dose given in the subcutaneous method, and to take the temperature from the third hour to the eighteenth hour following the injection.

Table 4 shows the result of a re-test with a double dose of tuberculin seven days after the ordinary test. It will be seen that all three animals reacted on the second test.

TABLE 4.

Line A shows the result of the test on April 6th.
Line B shows the result of the test on April 13th.

| No. | Initial. | 3rd hour | 6th hour | 9th hour | 12th hour | 15th hour | 18th hour | Result | Dose |
|---|---|---|---|---|---|---|---|---|---|
| 1 | A 102 | | | 103·6 | 104·2 | 104·2 | 104·2 | X | 3 c.c. |
| | B 102·4 | 104 | 103·6 | 104·4 | 104·2 | | | X | 6 c.c. |
| 2 | A 101 | | | 101·2 | 102·4 | 105·2 | 104·6 | X | 3 c.c. |
| | B 102 | 102 | 103·4 | 106 | 106·2 | | | X | 6 c.c. |
| 3 | A 102·4 | | | 103 | 105·2 | 107 | 106·4 | X | 3 c.c. |
| | B 102·2 | 103 | 103·4 | 106 | 106·2 | | | X | 6 c.c. |

The taking of the temperatures on the second test was not continued, because we had in each case a satisfactory positive result at the twelfth hour.

Tuberculin was at one time supposed to have a curative effect in tuberculosis ; that has proved a myth. But we now know definitely that tuberculin properly prepared and in the hands of a careful expert is a most valuable and reliable diagnostic agent for tuberculosis in cattle subjected to the test under ordinary conditions. I began the testing of herds in 1907, and, as will be seen from Table 1, we found in several cases a very high percentage of reactors. This naturally was very disappointing to the owners. For the satisfaction of the owners, as well as ourselves, we in some cases subjected the whole herd, including reactors, to a second test, and in no case have I ever seen what was once a definite reactor become a non-reactor at a subsequent test ; indeed, it was found that in those cases where the reactors were not removed from the herd, their numbers had increased through further infection.

*Reliability of the Test.*—In 1909 I was particularly fortunate in being able to test a herd whose numerical strength was maintained by buying in newly-calved animals, and when they were finished for the season's milk they were fattened and slaughtered for consumption on the premises. Here I had an unique opportunity of testing the reliability of tuberculin as a diagnostic agent. There were 36 animals in the herd which I tested on December 10th, 1909. The following table shows

the result of the test, and the date and result of the post-mortem examination on each reactor. It will be seen that tuberculosis in some form was found on post-mortem examination in every case of the reactors.

TABLE 5.

| No. | Description. Date of test. | Date of P.M. exam. | Result of sub-cutaneous test. | Result of P.M. examination. | Remarks. |
|---|---|---|---|---|---|
| 1–2 | Dec. 16th | | Free | | |
| 3 | „ | Feb. 24th | Reactor | T.B. | Tuberculosis found in the mediastinal lymphatics. |
| 4 | „ | Jan. 27th | Reactor | T.B. | Tubercular abscess in liver. |
| 5 | | Oct. 14th | Reactor | T.B. | Tubercular lungs. |
| 6–8 | | | Free | | |
| 9 | | May 13th | Reactor | T.B. | Tubercular lungs. |
| 10 | | | Free | | |
| 11 | | May 5th | Reactor | T.B. | Tubercular lungs. |
| 12 | | May 9th | Reactor | T.B. | Generalised tuberculosis carcase condemned. |
| 13 | | Jan. 4th | Reactor | T.B. | Tuberculosis of left lung. |
| 14 | | Jan. 3rd | Reactor | | Tuberculosis of both lungs. |
| 15 | | | Free | | |
| 16 | | May 2nd | Reactor | T.B. | Tuberculosis mediastinal lymphatic glands. |
| 17 | | Feb. 21st | Reactor | T.B. | Tuberculosis in lungs and sternum. No P.M. made. |
| 19 | | Jan. 17th | Reactor | T.B. | Tuberculosis mediastinal lymphatic glands. |
| 20 | | | Free | | |
| 21 | | Feb. 18th | Reactor | T.B. | Tuberculosis mediastinal lymphatic glands. |
| 22 | | Mar. 21st | Below | | See Table 6. |
| 23 | | Mar. 21st | Reactor | T.B. | Tuberculosis of lungs |
| 24 | | Oct. 7th | Reactor | T.B. | |
| 25 | | June 4th | Reactor | T.B. | „ „ |
| 26 | | | Free | | |
| 27 | | | Free | | |
| 28 | | May 9th | Reactor | T.B. | Tuberculosis of lungs |
| 29 | | Jan. 7th | Reactor | T.B. | Both lungs badly affected. |
| 30 | | Feb. 6th | Reactor | T.B. | Tuberculosis of lungs |
| 31 | | | Free | | |
| 32 | | May 17th | Reactor | T.B. | Tuberculosis in the pharyngeal lymphatics. |
| 33 | | | Free | | |
| 34 | | | Free | | |
| 35 | | June 6th | Reactor | T.B. | Tuberculosis in the mediastinal lymphatic glands. |
| 36 | | | Free | | |
| 37 | | May 19th | Reactor | T.B. | Tuberculosis in pharyngeal and mediastinal glands. |
| 38 | | Mar. 4th | Reactor | T.B. | Tuberculosis of lungs |

No. 22, a roan cow, was a doubtful reactor. The temperature chart was as follows :—

TABLE 6.

| Initial temp. | 9th hour. | 12th hour. | 15th hour. | 18th hour. |
|---|---|---|---|---|
| 101 | 101·8 | 102 | 103·2 | 103 |

On making a post-mortem examination I was unable to detect any tuberculous lesions. Of the twenty-two definite reactors tuberculous lesions in some form or another were found in every case.

The results of the above test and post-mortem examination is a great object lesson in many ways, but one fact which impressed me more than others at the time was that some animals which gave what might be considered as very positive reactions were only to a small extent affected with tuberculous lesions, as shown in Table 7.

TABLE 7.

| | Initial | 9th hour | 12th hour | 15th hour | 18th hour | Remarks. |
|---|---|---|---|---|---|---|
| 13 Red and white | 101·8 | 106·4 | 106 | 106 | 105·4 | T.B. in one left lung only. |
| 21 Dk. roan | 101 | 105·6 | 105·6 | 105 | 105·6 | T.B. in mediastinal lymphatics |
| 12 Roan | 101 | 101·4 | 102·4 | 104 | 104·2 | Generalised T.B. |

Nos. 13 and 21 were found on post-mortem to be comparatively slightly affected, whereas No. 12, which gave just a positive reaction, was found to be very extensively diseased. This serves to show that the degree of thermal reaction in the test will indicate if tuberculosis is present, but is no indication of the extent of the disease present.

Tuberculin when properly used is a most valuable aid in freeing herds from tuberculosis, but one testing of a herd with tuberculin is not sufficient. There is a period when the organism is digging itself into the animal tissues, but has not yet got firmly entrenched, that is to say, before the virus of the bacilli has got into the system. During this incubative period, before the animal's tissue is actually diseased, tuberculin injected will not always be followed by a reaction. Had this fact been more universally known and understood, many of the unfounded statements which have been uttered derogatory to the tuberculin test would never have been spoken or written. In order to derive the full benefit of the test when attempting to free a herd, it is advisable to follow the first test by a re-test of all the non-reactors six weeks later; this re-test, which should be considered as a completion of the first test, acts as a most searching diagnosis in the case of all animals. To ensure that the herd is being kept free, they should be tested every six months. All newly-purchased animals should be tested on arrival, and again six weeks later before being added to the herd.

This precaution is most necessary to establish success in building up a tubercle free herd. One reactor gaining admittance to a herd, especially in the winter months when they are being housed, may mean three or even six reactors at the next general test. The question naturally arises, Who is a competent person to carry out the testing of a herd ? I consider that the test should be carried out by one who understands the handling and feeding of cattle, the symptoms of disease in animals, the nature and action of vaccines, the method by which contagious diseases are spread, and who from his scientific knowledge can give a correct diciphering of the temperature chart. The one person who fulfils this rôle is the veterinary surgeon. The veterinary surgeon is closely identified with the diagnosis and eradication of tuberculosis of cattle in other European countries; and as it is illegal to perform certain operations on an animal except under an anæsthetic, so it should be

illegal for any person other than veterinary surgeons to inject vaccines into animals.

*Control of Tuberculin.*—This leads up to the question of control, which is an important one. Under present conditions there is an unrestricted sale of tuberculin, and knowing the effect it has on animals in that it interferes with ordinary testing, it is a great temptation to the unscrupulous to dope animals before sale. There are many other conceivable reasons why tuberculin should be controlled.

In order to remove the disadvantages which follow the open sale of tuberculin, its manufacture should not be allowed except in certain licensed premises and by licensed persons. Furthermore, its sale should only be permissible to veterinary surgeons or members of the medical profession. Foreign tuberculin sold in this country should also be controlled. Having a controlled and standardised tuberculin, it would simplify the testing of herds by veterinary surgeons, and by careful testing doubtful reactors would be reduced to a minimum. I am one of those who believe it is more economical in the long run to condemn an occasional healthy animal which gives a doubtful reaction than to allow an affected animal with a similar reaction to remain in an otherwise free herd.

To attempt to maintain a tubercle-free herd by buying in cows subject to passing the test, and at the end of the milking season to prepare them for the butcher, is a hopeless proceeding, and not likely to be attended with success, financial or otherwise. The attempt is more likely to succeed if young tubercle-free heifers are gradually added or calves are reared on tubercle-free milk, and the numerical strength kept up by home production.

I do not go so far as to say that errors never occur, but I think that with care they should be few and far between. That there is a tolerance to tuberculin we all admit, but the tolerance is much more suspected than real, and by taking precautions, errors in diagnosis even in those animals that have acquired tolerance through many injections can be avoided. For testing animals suspected of having acquired a tolerance I would employ the subcutaneous test, giving a double dose of tuberculin and taking the temperature from second to the twenty-fourth hour, and simultaneously employ the ophthalmic test, keeping the animal under observation for forty-eight hours. I consider that if due precautions are taken, fraud can be detected. Practitioners I know will say that it is not practical to test animals by a method that takes forty-eight hours. I maintain it is the most practical form of testing, because a client that purchases an animal for several hundred pounds, or one who has already a tubercle-free herd, would be very short-sighted not to pay a full and adequate fee for the certain knowledge that the animal is tubercle free.

### Discussion.

Professor Wooldridge said they owed a debt of gratitude to Mr. Brennan De Vine for the excellent way he had put his subject before them. He had not only shown them how reliable the tuberculin test was, but he had given excellent advice, which he thought should be followed widely. He was sure in some quarters sufficient attention to detail had not been paid, and on that account negative results had been obtained when positive results should have been, and vice versa. He generally agreed with the points in the paper, but there were one or two points with which he was at variance. He thought it was not necessary for the tuberculin to be obtained from the country in which the test was to be carried out. He suggested that the tuberculin was specific for all strains of bovine tuberculosis if it was obtained from any case of bovine tuberculosis. Tuberculin from the bovine strains in this country was just as specific as if obtained in South America. He agreed that tuberculin was almost, but not quite, infallible. He said not quite because there were certain circumstances which cropped up in the course of testing which worked against them, and these circumstances could only be detected by experienced and trained men, and only when the tests were carried out by such people were they carried out properly. If the tests were only carried out by rule of thumb, then they got an enormous proportion of fallacies and wrong results, as shown by post-mortem examinations. The use of the tuberculin test was no good unless it was used with brains and intelligence and expert knowledge; ordinary intelligence was not enough. Continuing, the speaker said the tuberculin test was a very searching one, and tests should only be carried out by trained men. He suggested that when an animal was purchased the best method would be for it to be, if practicable, quarantined for one month prior to the test being performed. If that were done, an animal in the incubative stage would have by that time developed lesions sufficient to produce a reaction, and during that period the animal would not have been exposed to any possible source of infection. The speaker next touched upon the question of temperature at the time of the test. It would be found that if the animal had been drinking copiously of water just before the temperature was taken, it would tend to reduce the temperature, and thus bring down a temperature which might have been regarded as a reaction. Conversely with regard to milking. The process of milking raised the temperature from a degree to a degree and a half. These conditions which affected temperature should be carefully guarded against. He protested very strongly against any slipshod methods being used for making a test. With regard to the ophthalmic method, Professor Wooldridge said by applying the tuberculin with a camel hair brush to the cornea, if one was doing a lot of animals there was a risk of carrying adventitious infection, and he thought it would be much better to drop the tuberculin on to the eye.

Mr. Deputy Neal said he considered Mr. de Vine's paper one of the most important and interesting documents that had been read at a Congress of that description for a very long time, and at that moment it had a most instructive bearing on the question which was now being considered by the Royal Commission sitting with regard to the embargo on Canadian cattle.

From some of the evidence given by the witnesses one understood that it was desired to keep out Canadian cattle because they wanted to keep the herds of this country free from disease. One had only, however, to refer to the table which had been placed in their hands that day by Mr. de Vine (which showed that out of 676 animals when tested 258 reacted and 30 were doubtful) to see that their herds were not free from disease, but, unfortunately, saturated with the deadly disease of tuberculosis. Worked out at a percentage, that meant that no less than 38·2 per

cent. of the animals submitted to the test were affected.

This showed how very important it was that they should do all they could to introduce into this country fresh blood, with a view to obtaining fresh constitution for our home breeds. It happened, as Chairman of the Cattle Markets Committee of the Corporation of London, he knew that the Corporation had had through their hands many thousands of Canadian cattle, and although every animal cleared in Deptford market had been inspected by a veterinary surgeon, he believed there was not any record of a single case of tuberculosis being discovered in the animals coming from the Dominion. He asked Mr. de Vine to let him have a copy of his paper, so that he could present it to the Royal Commission on Monday next, when he was giving evidence in the House of Lords. He was doing this entirely in the public interest. The question of increasing their herds was of vital importance to the population at the present time. The depletion of their herds of cattle and flocks of sheep was alarming. The whole of the population of Greater London was practically to-day being fed on foreign meat, the small percentage of home-killed meat being acquired by the richer part of the community, which was a very small percentage of the total population of Greater London.

The speaker pointed out what would be the position in the event of these supplies being interrupted. It must also be borne in mind that four-fifths of the cereals we required also came from abroad. It was easy to see, as proved in the recent war, that it was at that time very difficult indeed to maintain the people of this country, and if these supplies were cut off, and our herds and flocks were still further being depleted, it might prove impossible, in the event of another war, with the advance in science in manufacturing weapons of destruction, to obtain overseas supplies. If that failed, this country would be defeated by starvation, and not by force of arms. They had to re-habitate the herds and flocks of the country, and a perusal of the records for 50 years prior to the war proved that this could not be done by home breeding alone. In view of the difficult position they were standing in to-day, nothing was more important or more vital to the interests of the people than that they should take every possible step to increase the numbers of their cattle and sheep at home, so that in case of need they would have some reserve to fall back upon. During the 50 years 1863-1913 there had been a continuous falling off in numbers of cattle and sheep in proportion to the increase of the population, and he said it was vital to-day that some action should be taken to remedy this condition of things. For that reason he advocated the importation of live store stock cattle from Canada.

Dr. SCURFIELD said in 1894 he went to Denmark and saw the work being done there by Professor B. Bang, a well-known veterinary surgeon, and also a doctor of human medicine. In Bang's opinion the tuberculin test was practically infallible. The opinion of Nocard, the well-known French veterinary surgeon, was the same. He (the speaker) read a paper at the Newcastle Congress in 1896 on this test, and he moved some resolutions, which were passed unanimously, and he did not think it would be a bad idea if the Conference that day re-affirmed the resolutions of 1896, which asked the Government to provide the tuberculin test free of charge to those farmers who would carry out the necessary precautions with regard to isolation, and provided the test was only applied by a veterinary surgeon. The question of doping was already recognised in 1896, and the Government was asked to protect the tuberculin test by refusing to allow the test to be applied except by a veterinary surgeon. It was further suggested that all cattle that reacted should be branded. He had believed for 27 years that the tuberculin test was practically infallible when carried out by a trained veterinary surgeon.

Mr. ROWE MORRIS (Chester) said he wanted to warn the Conference not to drive this thing too far. If carried too far, he ventured to suggest the price of milk a gallon would be five shillings. Mr. Morris also protested against Mr. Deputy Neal being given a copy of the paper. He again warned them, he said, not to go too far, or they would drive agriculture as a business out of the country altogether.

A Deputy said that they came there to get information to make use of elsewhere. (Hear, hear.)

Mr. EATON JONES (Liverpool) said, in addition to being a veterinary surgeon, he was also a farmer, and he knew the difficulty of testing with tuberculin. In summer time it was almost impossible. He agreed that it should be done, but in what way was the farmer, by doing it, going to benefit? If he sold milk from a tuberculosis-free herd, were the public going to pay more a gallon for it? He considered that the public wanted more education on this. When the farmer took the trouble to keep his herd free from tuberculosis, he was entitled to receive some recompense for having done so.

Mr. T. PARKER said he was in entire agreement with what Mr. de Vine had said. Tuberculin compared in a similar manner to mallein, which they knew was used for testing horses suspected of glanders. Some years ago he carried out hundreds of tests with mallein, and amongst the cases where there were reactions, he did not remember one instance where they failed to find evidence of disease on post-mortem. He had not yet heard definite evidence of tuberculin in the test failing. In his opinion, the tuberculin test was reliable. He was of the opinion, however, that the test should only be carried out by an expert, and the same with regard to the post-mortem. He had heard of cases where, although the tuberculin had been carefully applied, and a typical reaction occurred as a result, no lesions had been discovered at the post-mortem. To apply tuberculin was one thing, but whether to blame the tuberculin or the observer as to failure in the test was another. He felt that, assuming that tuberculin were carefully used, and as a result typical reactions were obtained, if at the post-mortem he were unable to either explain or confirm the clinical test, he would be inclined to blame himself rather than the tuberculin. He gave one example of his experience of the test to illustrate its reliability:—A firm owning a dairy herd decided to give up cow-keeping, and before doing so applied the tuberculin test to all the animals. There was a total of sixteen cows and one bull. One bull and one cow did not react. These, therefore, were considered as being free from disease. Three cows which showed visible signs of tuberculosis were destroyed. Twelve cows thus remained, having been proven to be diseased, according to the test, but which, nevertheless, did not appear other than ordinary healthy cows. Having regard to the result of the test, the owners decided to have them slaughtered and subjected to inspection. They were, by arrangement, sent to a slaughter-house within the city of Newcastle-on-Tyne, where they were slaughtered and inspected. On making an extended examination of the carcases and internal organs (in the presence of the owner's veterinary surgeon, who had applied the test), lesions of tuberculosis were found to exist in some parts of the carcase or organs of every one of the twelve animals slaughtered.

Professor HOBDAY said that in America they had the Accredited Herd System. In connection with this system a large number of cattle-owners had banded themselves together and had had their cattle tested for tuberculosis, with the result that they had now a number of tuberculous-free herds, which were entered on an official list. There was no reason why they should not do the same thing in England. At the present moment the Veterinary Director-General for Canada, Dr.. Fred Torrance, was warning the

Canadian farmers that they must adopt this accredited herd system, or they would find the American market closed to them. The speaker referred to figures mentioned at a recent combined meeting of the Fellows of the Royal Society of Medicine and the Central Branch of the National Veterinary Association, at which the statement was made that in 76 per cent. of children under five years of age suffering from tuberculosis of the glands of the neck it was found that this was caused by tubercle bacilli of bovine origin obtained by drinking tuberculous milk. It was stated that over 10,000 children a year died from tuberculosis caused by drinking tuberculous milk, and if any other poison was sold in the same way as tubercle bacilli were distributed in milk, the seller would not be fined £3 (as a man was the other day for knowingly selling tuberculous milk), but would at once be made a criminal of. It was criminal to allow tuberculous milk to be sold when statistics proved that many thousands of children were infected in this way.

### The Reply.

Mr. Brennan de Vine said he was very pleased that so many were in agreement with what he had said in the paper. There were some imaginary difficulties put forward as regards the eradication of tuberculosis by the use of the tuberculin tests. As to the reliability of the test, he had no shadow of doubt, but, like Professor Wooldridge and other speakers, he was of the opinion that it was not reliable unless in the hands of properly trained people. If the test was properly carried out, it was absolutely reliable. With regard to using the brush for the ophthalmic method, he had injected thousands of animals, and only had one abscess following the hypodermic injection, and the same thing applied to the brush. Of course, it was just as easy to drop the tuberculin direct into the eye. The importation of Canadian cattle into this country had been referred to. He had not yet heard one sufficient reason why Canadian cattle should be kept out of the country, and he was very glad they had got such a man as Mr. Deputy Neal to champion the case. There was less tuberculous disease in Canadian cattle than in English cattle. One important point that was brought forward was, who was going to pay the farmer for carrying out these tests? If a farmer had a tuberculous-free herd, he did not suffer from loss by having diseased cattle. That was one form of payment. They in Birmingham had given a lead to the Government of the country by proving they could have tubercle-free herds. Having proved that it could be carried out on a small scale, it should be carried out throughout the country. Mr. de Vine mentioned that several sanatoriums asked for tubercle-free milk, and if the Health Authorities did their duty, they would see that invalids and children were only given tubercle-free milk. Tuberculosis was more or less a localised disease, and the experienced meat inspector could remove the diseased meat and save parts of the carcase; but with milk they might have a cow perfectly healthy to all appearances yet giving diseased milk. The farmer must not look for profit the next day with a tuberculous-free herd; it was a gradual profit.

It was proposed by Dr. Scurfield (Folkestone) and seconded by Mr. Brennan de Vine (Birmingham):—

> "That this meeting re-affirm the resolution passed at the Congress of the Institute in 1896 for the purpose of encouraging the use of the tuberculin test for eradicating tuberculosis from our herds, for restricting the use of the test to veterinary surgeons, and for preventing the improper use of tuberculin."

Carried unanimously.


# The Veterinary Record.

*6th August, 1921.*


## THE HUMAN TOUCH.

No veterinary plaint is more outworn with usage than the oft-reiterated assertion that the public know little and care less about our work and that, as a direct consequence, the doctrine of self-help has a peculiar application to our profession.

It is idle to deny that the germ of truth contained therein stands revealed when comparison is made between our position and that of the too comprehensively termed "medical man." Signs are not wanting, however, that this indifference might be transformed into a vital interest, given a little tactful wielding of a wand which lies (and has lain, almost un-noted by us for years) ready to our hand.

A vital interest is one which touches the life of the people, and while the majority have been bemoaning the lack of such keys to the esteem, consideration and purse of the community, a few, and notably amongst these Professor Hobday, have done the profession the inestimable service of placing this key within its grasp.

We hear much of the advisability of organising an adequate advertisement campaign on behalf of the profession to gain the ear of the public for the manifold benefits the latter receive, that more recognition may fall to the former. In our opinion, the recent efforts of those who, like Professor Hobday, have sought to focus attention on the diseases communicable from animals to man constitute the best service of this very kind. And immeasurably the greatest of these diseases is tuberculosis.

A man who had "made his pile" went to Church to give thanks—loud as these were they failed to drown a more insistent voice: "Do not thank Me, thank the Devil."

The tuberculosis bacillus is the chief agent of the devil of disease amongst the human population, and it operates in a degree which is only now beginning to be appreciated, through the tuberculous cow.

There has never been, is not now, and probably never will be, a point at which veterinary work comes into closer touch with the long-sought human interest than over this question of tuberculosis. The time is most opportune.

Let the profession devote all its energies, both individually and as an organisation, to taking its

justifiable, leading share in the campaign for the eradication of this disease.

There is, in the light of these considerations, vast import in the following words taken from Mr. De Vine's paper, "The Tuberculin Test in Cattle," which we publish in the present issue: "I think the time is not far distant when our profession will be called upon to undertake much of the work in connection with the eradication of tuberculosis in this country. . . ."

Take up the wand, and wield it with effect.

## OBVIOSITIES.

A hideous word, and one intended to reveal an unpalatable, naked truth. It is evident in the case of a journal, as is customarily said of more intimate literature, that often the omissions are of more moment than the contents, their import lying in their implications.

The absence of a "Clinical and Case Reports" section from this issue of the *Record* falls under this atrocious, deliberately selected heading. We charitably conjoin the subsequent implication, that every reader of the *Record* now realises that it is to him, and to him alone, that we have to look for the straw whereby we may make the bricks essential for the most modest clinical column. But the use of the term "modest" is distasteful to us in such a connection. We are well aware of the miserable modicum of desire that the profession's paper should be a live reflection of the field of practice, that would be sufficient to yield us a fine selection of first-hand information, which it would be our privilege to present for the interest and edification of all our members.

A crown of rare irony rests upon the pile of communications from such as, sending nought to fill the gap themselves, forward caustic comments on the paucity of our case reports. They at least have the clinical column they deserve.

The word "modesty," too, reveals to us indifference masquerading as a touching diffidence to attempt the expression on paper of experiences such as are the admirably worded subjects of discussion wherever opportunity arises for the less arduous mode of communication.

Yet, surely, it is not asking too much of our readers that they should exercise just the little additional exertion required to secure a wider and yet more appreciative circle.

Our thanks to those who have provided us with cases in the past are coupled with an earnest appeal that they may redouble the good work of diligently recording for us in the future, and that, of many hundreds of readers, far more than at present will make a really serious effort to support the *Record* with "Clinicals."

## ROYAL COLLEGE OF VETERINARY SURGEONS.

### Record of Examinations, July, 1921.

GLASGOW:—

*Class A.*

W. J. O'Mara.
L. B. A. Grace.
T. McWilliam.
R. Renfrew.*
D. Brown.
A. Hunter.
J. McQuaker.
A. Sillers.
B. Nairn.*
W. C. Smith.
J. Mitchell.*
W. C. Maitland.

*Class C.*

W. A. Burns.
C. A. McGaughey.*
J. Masterson.

LIVERPOOL:—

*Class D.*

T. Hare.
W. J. Parry.

EDINBURGH:—

*Class A.*

A. Brownlea.
G. S. Cowin.
E. R. Corrigall.
W. Cormack.
W. Duncan.
C. E. Hall.
J. Hill.*
J. R. M. Innes.*
W. P. Isherwood.*
J. D. Macrae.
J. D. Macbeth.
J. Smith.
P. L. Snodgrass.
E. Ackroyd.
E. A. Burgon.
J. W. E. Budge.
G. R. Jamieson.
E. I. MacGregor.
C. Mitchell.
C. S. Scott.

*Class C.*

K. K. Bateman.*
H. W. Bodger.
D. Dunbar.*
A. E. Ferguson.*
A. Fulton.
J. R. Haddow.
T. Y. Littler.
A. D. McEwen.
D. L. McWhirter.

*Class B.*

W. J. Macgregor.
J. McF. McLinden.
W. C. Auld.
D. T. Reid.
S. G. Abbott.*
H. Begg.
G. W. Begg.
J. Sommerville.
R. Turnbull.
A. Cruickshank.*
J. Stewart.*
A. Sutherland.
J. Weir.*
J. T. Taylor.
J. Mair.
J. A. Bradley.
J. Currie.

*Class D.*

R. M. Smith.
J. A. Turner.
C. T. Murphy.
C. Watson.
J. D. Ferguson.
T. H. Michie.

*Class B.*

H. B. Allan.
W. G. Beaton.*
J. R. M. Braes.
J. L. Brain.
E. R. Callender.
J. Carmichael.
W. Devlin.
H. M. M. Duff.*
P. D. Dunn.
K. A. Forker.
J. R. Frean.
H. W. Griffiths.
E. F. Hardwick.
H. K. Hesketh.
W. A. Ireland.
W. J. Ironside.
P. L. le Roux.
R. F. Montgomerie.†
M. R. F. Pannikar.
G. Pfaff.*
S. Sharp.*
J. L. Stewart.*
F. S. Whitfield.
G. Wilson.*
R. S. Wilson.
J. Small.
C. S. Forsyth.
R. B. H. Murray.
D. Murray.

*Class D.*

J. R. Cunningham.
T. W. M. Cameron.
C. H. Ducksbury.
F. A. Davidson.
R. M. C. Gunn.
A. M. Graham.
F. J. Hood.
A. J. McCarmick.

Class C—*Cont.*
W. A. R. Ogilvie.
A. McK. Sievwright.
G. V. Tyerman.
W. M. Webster.
A. R. C. Bowie.

Class D—*Cont.*
J. G. Ross.*
F. E. Somer.
A. C. Urquhart.
W. R. Wallace.
A. B. Kerr.

DUBLIN :—

*Class A.*
J. Kyne
H. G. McShane
J. A. Maybin
E. Pattison
P. D. Baylis*
G. E. Clarke*
H. F. F. Clarke
N. Clarke
F. Crowne†
W. W. Dunlop
W. V. Earnshaw
P. J. Healy
J. P. Hegarty*
J. R. Kellett
A. G. McCrea
F. H. McDonnell
J. McIlwaine
J. I. Magowan
W. C. Maguire
L. H. B. Poer
T. G. Stewart
R. Walsh

*Class B.*
J. J. Dundon
S. Gourley
G. A. Morrin
H. Bell
J. Bell*
F. St. J. E. Bingham
A. D. J. Brennan*
R. M. Campbell
J. J. Collins*
M. Crawford
O. T. de Villiers*
J. A. French
G. Hobson
J. K. Kearney
H. G. Lamont†
M. McDonough*
A. McFarlane*
D. F. McKinney
G. McWilliams
W. P. Moss*
F. J. Mullane*
M. M. Neser
T. F. O'Brien
P. I. O'Donoghue
T. Y. Ranson
T. H. Robinson*
G. Rocker
J. J. Shankey*
A. L. Thompson*
C. J. Van Heerden
N. Walshe
L. T. Whitby

*Class C.*
A. F. Callanan
P. Carron
W. J. Dill
C. Lucey
P. J. Nolan
J. O'G. Schofield
S. L. Black
R. D. Callaghan
J. P. Camac*
J. A. Flynn
R. H. Gardner
H. D. Heggarty
J. J. E. Kenny*
H. McConnell
T. J. Maguire
T. A. Mernagh
F. O'Leary
P. M. Quille
R. W. Sainsbury
T. Treacy
E. F. Twaddle*

*Class D.*
S. W. de Villiers
C. McCloskey
W. E. McDonald
J. E. McIlwaine
D. D. Morton
J. M. Murphy
W. O'Callaghan
L. O'Dowd
M. J. Ryan
M. W. Sheppard

* Denotes second class honours.
† Denotes first class honours.

# Abstracts and Reviews.

## The Accuracy of Bacterial Counts from Milk Samples.

At the present time all of the market milk sold in New York State is graded on a system based upon the number of bacteria present in the milk. Likewise an increasing amount of milk is being bought from dairy farmers on the same basis. This makes it important that the methods of analysis used in the grading should be sufficiently accurate to justify the use made of them.

*Microscopic methods of counting bacteria.*—Certain things prevent making the microscopic counts with extreme accuracy. They include :—

(*a*) Optical limitations, which make it difficult to prepare definite measured quantities of milk in such a way as to make all of the bacteria show with sufficient distinctness to permit counting under a microscope.

(*b*) Impossibility of measuring with absolute accuracy the exceedingly minute quantities of milk which are the largest amounts that can be examined satisfactorily at any one time.

(*c*) Impossibility of telling with certainty whether the bacteria seen were actually living when the preparation was made.

(*d*) Introduction of extraneous bacteria.

*Agar plate methods of counting bacteria.*—The chief difficulties of interpretation by these methods may be summed up as follows :—

(*a*) It is never certain that all of the bacteria originally living in the milk have grown and formed countable colonies on the plates.

(*b*) Overcrowding of the colonies on the agar may prevent the development of some bacteria, or single bacterial colonies may grow so rapidly that all other colonies are repressed.

(*c*) The most fundamental difficulty arises because the bacteria frequently exist in milk in clumps. Since these clumps cannot be perfectly separated into their component individuals by any known method of manipulation, the subsequent colonies may have arisen from either single or groups of individuals.

(*d*) Introduction of extraneous bacteria.

(*e*) Difficulty of measuring small quantities of milk, even by the admittedly accurate dilution method.

The agar plate methods include the usual one whereby microscopic colonies are counted, and the little plate method whereby the colonies are examined and counted under a microscope before they are visible to the naked eye.

*Comparison between microscopic and agar plate methods of counting.*—Because of the fact that estimates made from plate counts must be based on a count of colonies, which should not exceed 300 per plate, the amount of milk examined is largest when the bacteria are few in number. Consequently it is probable that the accuracy of results decreases as the number of bacteria increases.

In contrast to this, microscopic counts are made from a small but fairly constant amount of milk regardless of the number of bacteria present. Probably the most accurate results accrue when the bacterial contamination is of an intermediate nature. When there are few bacteria present the percentage accuracy becomes poor, though for practical purposes in grading milk this is of little consequence, because the absolute error is not large.

The authors then discuss at length the technique employed, and summarise the result of a great deal of careful work in the appended table :—

SERIES A.—FINAL SUMMARY OF PLATE AND MICROSCOPIC COUNTS.

| Sample number | Plate count. | Group count. | Individual count. | Average size group. | Notes. |
|---|---|---|---|---|---|
| 1 | 10,600 | 18,700 | 103,000 | 5·5 | Herd milk. |
| 2 | 10,400 | 19,600 | 92,000 | 4·7 | Herd milk. |
| 3-5 | 6,000 | 5,000 | 15,000 | 3·0 | Herd milk. |
| 4 | 45,000 | 41,000 | 145,000 | 3·5 | Herd milk. |
| 6 | 78,000 | 46,000 | 185,000 | 4·0 | Market milk. |
| 7 | 72,000 | 47,000 | 202,000 | 4·3 | Market milk. |
| 8 | 30,000 | 51,000 | 189,000 | 3·7 | Market milk. |
| 9 | 98,000 | 80,000 | 383,000 | 4·8 | Market milk. |
| 10 | 285,000 | 94,000 | 721,000 | 7·7 | Market milk. |
| 11 | 52,000,000 | 93,000,000 | 99,000,000 | 1·06 | Inoculated with long-rod, lactic acid organism. |
| 12 | 48,000,000 | 49,000,000 | 67,000,000 | 1·4 | Inoculated with the colon bacillus. |
| 13 | 135,000,000 | 37,000,000 | 163,000,000 | 4·4 | Fresh milk incubated at 37° C. for twenty-four hours. |
| 14 | 9.900,000 | 5,900,000 | 150,000,000 | 25·4 | Market milk known to contain streptococci. |
| 15 | 2,000,000,000 | 1,500,000,000 | 2,700,000,000 | 1·8 | Milk nearly curdled containing *Bact. lactis acidi.* |
| 16 | 121,000 | 60,000 | 387,000 | 6·4 | Market milk. |
| 17 | 23,000 | 13,000 | 234,000 | 18·0 | Market milk found to contain streptococci. |
| 18 | 1,900 | 12,000 | 34,000 | 2·7 | Market milk. |
| 19 | 12,000,000 | 8,400,000 | 28,000,000 | 3·3 | Market milk. |
| 20 | 5,600,000 | 5,200,000 | 26,000 000 | 5·0 | Market milk. |
| 21 | 390 | 3,000 | 4,000 | 1·3 | Milk from single cow. |
| 22 | 623 | 5,500 | 7,250 | 1·3 | Milk from single cow. |

The results indicate the wide variations that may occur between the plate and microscopic counts, the primary cause of which appears to be the existence of clumps of bacteria which were not separated into their component individuals in preparing the agar plates. The average number of individuals in the clumps of bacteria present commonly varied between two and six, but when streptococci were present the number was much higher.

The chief limitations upon the accuracy of the microscopic counts appear to be those involving the skill of the analyst making the observations and the patience necessary in order to examine a sufficiently large quantity of milk to give an accurate average. Given unlimited time and numerous duplicate preparations from a sample of milk, a skilled microscopist can secure reasonably accurate counts of the number of individual bacteria present in any ordinary sample of milk. Yet the laboriousness of this proceeding limits its usefulness, and makes it impossible to actually count the bacteria when examining large numbers of samples.

Fortunately neither the inaccuracy of the plate counts caused by clumping nor the limitations of the microscopic technique just noted appear to be so great as to prevent the use of either technique where the purpose is to grade miscellaneous samples of unpasteurised milk into two or three grades. When a finer classification is required (as is now the case in many Grade A plants) the use of the so-called simplified routine control methods should not be regarded as satisfactory.

[By R. S. Breed and W. A. Stocking, jun., *Journal of Dairy Science*, 1921, vol. IV., No. 1, p. 39.]

H.E.H.

## The Effect of Pasteurisation on the Number of Bacteria in Milk when this is determined by the Direct Microscopic Count.

The object of examining milk is generally to obtain such information as will permit the analyst to determine as far as possible the conditions under wich the milk was produced, and also to judge of its keeping quality. It is obvious that in the case of pasteurised milk the agar plate methods can give no indication concerning the history of the milk previous to heating. It has been thought that the direct microscopic determination of the number of bacteria did not possess the above limitation, and could therefore be used more successfully in the examination of pasteurised milk than could any other method.

Of course, it has for a long time been known to bacteriologists that when milk is used as a culture

medium, and consequently sterilised before inoculation. the original flora were so charged by heating that they cannot be found by the microscope subsequently. What the authors set out to show was the effect or the staining properties of bacteria of the low temperatures of commercial pasteurisation.

To this end they pasteurised a number of milk samples at 145° for thirty minutes. The milks were cooled at once, and stored at about 50° F. Microscopic preparations were made from the milk immediately before pasteurisation, and at varying intervals thereafter. The technique of staining was that of Breed—not described. Market milks were used. The personal factor was as far as possible eliminated by the fact that a number of individuals, working at different times, were concerned in obtaining the results. A detailed count of the bacteria was made in a number of samples, and the data are recorded on the accompanying table.

The comparative percentage of the bacteria that can be detected with the microscope at varying intervals after pasteurisation at 145° F. for thirty minutes.

| | Sample. | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| | % | % | % | % | % | % | % | % | % | % | % | % | % | % | % | % |
| Raw ... ... ... ... | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Immediately after pasteurisation ... ... | 60 | 30 | 77 | 30 | 39 | 60 | 25 | 18 | 83 | 24 | 75 | 50 | 43 | 56 | 50 | 69 |
| Six hours after ... ... | 50 | 8 | 111 | 30 | 13 | 37 | 18 | 27 | 21 | 4 | 25 | — | — | — | — | — |
| Twenty-four hours after | — | 26 | 122 | 10 | 39 | 46 | 12 | 27 | 100+ | 100+ | 100+ | 20 | 20 | 11 | 6 | 3 |
| Forty-eight hours after... | 25 | 30 | 166 | 100+ | 100+ | 94 | 100+ | 100+ | — | — | — | 30 | 20 | 9 | 6 | 25 |

It is to be noted that the percentage reduction varies from sample to sample. Sample 3 in no examination revealed less than 77% as many cells as were present in the raw milk; and in sample 16 only 3% as many bacteria were found twenty-fours hours after pasteurisation as were noted in the raw milk. Probably these percentages represent the limits of the effect of the pasteurising temperature on the number of bateria in milk as shown by the direct microscopic method. Thirteen out of the sixteen samples showed between 10 and 30 per cent. as many bacteria after pasteurisation as in the raw milk, and these reductions probably represent the average that will be noted in practice. In two out of the sixteen samples the minimum number of bacteria was found immediately after pasteurisation; in six samples the minimum number was found at the sixth hour; in five at the twenty-fourth hour; and in three at the forty-eighth hour.

The bacteria that have not been killed by pasteurisation will begin to grow when the milk is stored, and sooner or later the number of cells in the pasteurised milk will exceed the number in the raw milk.

Pasteurisation of milk inoculated with pure cultures gave results similar to those with naturally inoculated milks. Milk cultures of various bacteria were seeded separately into raw milk in such amounts that the bacteria were fairly numerous on a Breed plate. Stained preparations were made immediately from these milks, after which they were pasteurised, cooled, and stained again. They were then stored in an ice box, and preparations were made again after twenty-four and forty-eight hours.

| Name of Organism. | After twenty-four hours |
|---|---|
| B. coli ... ... ... | No apparent change in staining or in number of cells. |
| Staphylococcus pyogenes aureus ... ... | No apparent change in staining or in number of cells. |
| Streptococcus pyogenes | Cells unevenly stained, some very faint. Decrease in number. |
| Bact. lactis acidi ... | Cells unevenly and faintly stained. Marked decrease in number. |
| Bact. bulgaricum ... | Cells faintly stained. No apparent decrease in number. |
| B. anthracis ... ... | Only an occasional cell, and that faintly stained. |
| B. subtilis ... ... | No cells stained. |

Thus a direct microscopic count of bacteria in pasteurised milk gives a very imperfect picture of the bacterial content of the same milk before heating.

[By E. G. Hastings and A. Davenport, *Journal of Dairy Science*, 1920, Vol. III., No. 6, p. 494.]

H.E.H.

# Notes and News.

### Poultry Research Grant.

In his address at the opening session of the National Poultry Parliament, Lord Ancaster Parliamentary Secretary to the Ministry of Agriculture, acknowledged the pressing need for research in aid of the poultry industry, but pointed to the concurrent demand for economy. In reference to the Government's allocation of £850,000 for agricultural research in this country (the other £150,000 of the promised £1,000,000 going to Scotland), he made the definite statement that "the claims of the industry will be met out of the draft." He was unable to mention the actual amount that will be available for this purpose, but added that the details of the allocation would be settled after consultation with the Poultry Advisory Committee.

In view of the other and bigger claims that have to be met from the same source, it is a question how far the ground for poultry research can be covered, but those who advise and those who decide may be urged to put the investigation of disease in the forefront of the programme. No matter is of greater economic importance now. Hitherto there has been a remarkable lack of practical interest in poultry diseases on the part of the authorities, and the available official information on the subject shows how very limited are the investigations that have been made. In a home industry in which the value of the produce approached £60,000,000 in 1920, according to Lord Ancaster's statement, some serious effort should be made to check the spread of such diseases as avian diphtheria and chicken pox—to name two that are causing increasing anxiety. The widespread incidence of the former is a continual menace to high-class stock; it invades the carefully selected pens in egg-laying tests, and its presence was detected in the poultry tent of a recent important agricultural show.—*The Times.*

### The Returning "Carriage and Pair."

Whether it is the cycle of fashion, a longing for "dash" and "sensation," the natural desire of the sex feminine "to be somebody and look somebody," or whether it be for economy and real affection for horses, it is difficult to say; the fact remains, however, that there are signs that my lady is returning to her old love and that of her forebears. The barouche horse and smart coachman are once more coming into their own. The London dealers tell us that they are daily receiving inquiries for pairs. We see the number increasing in town and country, we know of many resurrected carriages, and one hears ladies in all parts of the country admiring the carriages of those who have acted as pioneers of the revival. The most original and unconventional women in the world—those who really enjoy being as other women are not, and who rejoice in doing outlandish things—do not at the bottom of their heart of hearts care to feel themselves a Lilliputian amongst neighbouring Gullivers. Everyone nowadays has a car; few have a carriage and pair. To-day a motor brings neither honour, glory, "dash" or "sensation." All these belong to the carriage and pair. So it is that one hazards an opinion that the fashion restarted will grow and give the lie to the oft-repeated statement that the day of the harness horse has gone for ever. Incidentally, how many young men are there in the country to-day who could be entrusted with a high-mettled pair?—*Live Stock Journal.*

### Exportation of Live Stock to Argentina and Uruguay.

The Ministry of Agriculture and Fisheries is officially informed that the Argentine Government issued a decree on the 14th instant, authorising the importation of live stock into Argentina from the United Kingdom, provided the stock is carried on ships which make a direct voyage from British to Argentine ports. A decree was issued by the Uruguayan Government on the 11th June allowing the importation of live stock from the United Kingdom from the 5th July provided the stock is carried on vessels that do not touch at any port on the continent of Europe or at Brazilian ports. The importation of live stock, both into Argentina and Uruguay, will continue to be subject to the ordinary importation regulations in force in those countries, and stock will be required to be accompanied by the usual exportation certificates of the Ministry of Agriculture and Fisheries.

### Foreign Oats for Horses.

The cheaper sorts of foreign oats, which represent the largest proportion of our oat imports, are much inferior in feeding value to home-grown oats of average quality. They are altogether too poor in quality to be of any use in feeding horses which are required to be in hard condition for fast work, though they may answer as corn for horses which are kept for business and commercial purposes, such as vanners, contractors' horses, etc.

The only recommendation of these inferior sorts of foreign oats is their cheapness, and it is for this reason that their use for horse-feeding purposes commends itself in so many cases. Russian and other foreign oats of inferior quality are often badly contaminated with weed seeds of a darker colour, and can be readily detected. The presence of these in any appreciable quantity in a sample of oats is a decidedly objectionable feature, as they are apt to prove harmful, and should be avoided.

The better sorts of imported oats which are of a satisfactory bushel weight are just as suitable as horse corn, and of equal feeding value as home-grown oats of a similar quality and weight, provided they are in sound condition. There is, therefore, no objection to the use of foreign oats so long as

they come up to the required standard, and are sufficiently heavy. Imported oats are often passed as home-grown, and in the case of good samples it is almost impossible to tell the difference between the two.—*Live Stock Journal.*

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### The Tamworth Pig.

While pig breeding generally is making such rapid strides in this country, and societies are enrolling members at an unprecedented rate, it seems a great pity that the oldest breed—the Tamworth—should be neglected. The reason is not hard to find; for the limited number of pure-bred Tamworths has resulted in so much in-breeding that their properties have become impaired. The only solution, and one which the Tamworth breeders will no doubt oppose, appears to be the opening of the herd book to a limited number of unregistered sows showing pronounced Tamworth characteristics. If this were done for a limited period, and the progeny of such animals carefully inspected before admission, there seems to be little doubt that the breed would benefit considerably by that infusion of fresh blood which is essential if the Tamworth is to take its right place in the front ranks of British breeds. This would ultimately benefit every present as well as every future breeder.

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### "Quack Veterinary Surgeons.

The following letter recently appeared in the *Bristol Times and Mirror*:—

Sir,—Under the heading of "Cruelty to Animals," a Fellow of the Royal College of Veterinary Surgeons had in the *Spectator* of June 11th a powerful letter, the purport of which, in the interests of the animals and of the public, cannot be too widely known.

It is an exposure of the horrible and entirely unsuspected cruelties of which animals are the victims through the employment of ignorant charlatans, *i.e.*, unqualified veterinary surgeons, to treat them.

The writer gives a few examples taken at random from his experience of the almost incredibly gross forms of cruelty perpetrated by charlatans under the pretext of treatment in these enlightened days. For a tumour in the neck of an animal, the village quack applied friction with a flat stick and crude sulphuric acid. In five days the oil of vitriol ate out the tumour and the jugular vein, so that the animal bled to death. No one can imagine what the animal suffered during those five days, for the crude sulphuric acid would be like liquid fire in contact with the raw surface of the living tissues. Four other cases, scarcely less cruel, are given.

People who could perpetrate such absurd and inhuman atrocities have no more knowledge how to treat animals than the animals themselves. Ignorance and guilt continue to hold their relentless inquisition. It should be made illegal, under heavy penalties, for unqualified persons to treat animals, or for the owners to employ such charlatans, which, if they had even sense enough to know their own interests, they would not.

Here is a serious and unrecognised evil crying loudly for the efforts of humanitarian reformers, and which it is quite possible to abolish.

Maurice L. Johnson,
6 The Polygon, Clifton, Bristol.

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### Importation of Animals into Ireland from Great Britain.

Owing to the improvement in the foot-and-mouth disease position in Great Britain, the Department of Agriculture and Technical Instruction for Ireland have decided to relax, as from the 18th July, their embargo on the importation into Ireland of ruminants and swine from England and Wales so as to allow of the landing of these classes of animals under the conditions laid down in the Departmental permit. Intending importers should, in the first instance, apply to the Veterinary Branch of the Department (50 and 51 Upper Mount Street, Dublin), stating in the application the number and class of animals which it is desired to import, and the purpose for which the importation is intended. It should, however, be understood that permits will not be granted for the importation of animals located within a foot-and-mouth disease scheduled district, or which have been in a foot-and-mouth disease scheduled district at any time during the six weeks preceding intended date of importation. The already existing arrangements for importation of animals into Ireland from Scotland continues.

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### Poultry Husbandry.

Following the formation by the National Poultry Council of a National Poultry Examination Board for the granting of a diploma in poultry husbandry, as announced in *The Times* of May 16th, arrangements for a training course, to extend over a complete session of three terms, at the Harper Adams Agricultural College, have now been made by Principal P. Hedworth Foulkes, the chairman of the board.

The subjects include poultry husbandry—practical work, building construction, the business side, bookkeeping, etc.; elementary science—anatomy, physiology, chemistry, diseases; agriculture in relation to poultry and horticulture. The instruction will take the form of lectures, demonstrations, and participation in the practical work of the college farm. The course is open to both men and women—resident and non-resident—and is likely to afford just that opportunity for the preparation of instructors in poultry keeping that has been so long needed, and which was contemplated in the ill-fated scheme for the proposed National Poultry Institute.

With the settlement of the training question so far satisfactorily in view, there remains the urgent need for research, the other branch of work that would have come within the scope of the institute. So far as this has to do with the investigation of diseases—the most vitally important part of the subject—some arrangement may possibly be made on the lines already indicated by Professor O. Charnock Bradley (Royal Veterinary College, Edinburgh), who has suggested that use should be made of existing institutions, and that it would be unwise to separate the study of avian diseases from that of mammalian pathology. It is understood that the appointment to the staff of the Veterinary Laboratory of the Ministry of Agriculture of an additional pathologist, who would devote his whole attention to the investigation of poultry diseases, has been under consideration recently, and a compromise on these lines is presumably in contemplation.—*The Times.*

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### World's Trade in Animals and Animal Products during the War.

The figures of the international trade in animals and animal products during the war are given in a publication entitled "Commerce international du Bétail et de ses Dérivés," and issued by the International Institute of Agriculture at Rome. Imports and exports during the five years 1915 to 1919 of live stock, meat, fats, milk, butter, cheese, leather, skins, and wool are given for all countries. The information should be of much interest to traders in these products.

Generally, the figures show that, during the war, the world's trade in live animals gave way to the trade in frozen and chilled meats. Argentine, Brazil, Canada, the Union of South Africa, and New Zealand substantially increased their exports of beef, while Uruguay and New Zealand increased their exports of mutton, and Canada and the United States their exports of pork. A very considerable increase also came about in the exportation of animal fats, lard and bacon from Argentine, Brazil, the United States, China and New Zealand. The exports of condensed milk from the United States made a ten-fold increase in the course of the five years, passing from 35,000 metric tons in 1915 to about 390,000 in 1919. The butter exports from North and South America increased continuously, while those from Denmark, Holland, Russia and Sweden diminished.

The export of cheese from European countries decreased very considerably, especially from Holland, Switzerland, Italy and France. The increase towards the end of the five-year period in the international trade in leather is also shown.

The mention of these few items will serve to give an idea of the very interesting nature of this publication, which is in French, and can be obtained from the International Institute of Agriculture at Rome. Price 8 francs.

### A New Method of Milking.

Dr. C. H. McFall, of Florida, Ala., stands sponsor for the following story which was recently published in his local paper :—

A man at Forsyth, Georgia, has discovered a new way to milk a cow. He has trained his cow to give down her milk by the simple process of working her tail up and down like a pump handle. He began his training by using one hand to draw the milk and at the same time moving her tail up and down with the other. In the course of a few lessons he would occasionally release the cow's teats and continue the tail movement, and after a few days' time he could milk her "dry" in a short time with the tail.

He found it necessary, however, to always begin milking in the old-fashioned way. At first he was apprehensive of his success, because he was afraid his cow would milk herself fighting insects with her tail, but he has learned that, unlike a horse, a cow can switch her tail only from side to side.—*Journal of the American Veterinary Medical Association.*

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After dealing with two cases of working unfit horses, Mr. Chester Jones, the Bow Street magistrate, said :

"The amount of swindling that is going on in selling horses to men just starting in business is something terrible.

"These young fellows don't know a bit what they are buying."

Mr. Wm. Kirk, veterinary surgeon, said that one horse which had been bought for £30 was worth only £7.

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The Ministry of Agriculture and Fisheries has received the following information from the International Agricultural Institute at Rome :—

The yield of winter wheat in the United States is estimated at 78,605,000 quarters, or 109 per cent. of last year's yield and 110 per cent. of the average of the five preceding years. The rye crop is estimated at 8,398,000 quarters, or 104 per cent. of last year and 104 per cent. of the average.

The wheat crop of India is estimated at 31,531,000 quarters, or 69 per cent. of last year and 73 per cent. of the average.

The area sown with wheat in 1921, in a group of countries in Europe and North Africa which produce 16 per cent. of the world's average yield, is 49,003,000 acres, or 103 per cent. of last year. The area under rye in the same countries is 15,213,000 acres, or 98 per cent. of last year. Crop conditions in Western and Central Europe are generally good.

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*Stirlingshire Grants to Veterinary Colleges.*—Stirling County Council have agreed to make a grant of £50 to the funds of the Glasgow Veterinary College, out of the equivalent grant, subject to the approval of the Secretary for Scotland. They also agreed to make a grant similar to that made last year to the Royal (Dick) Veterinary College, Edinburgh.

"To make a single airship of the R33 type no fewer than 825,000 gold beater's skins were required under the old method, and as only one skin could be obtained from each ox, the Admiralty were faced with the prospect of having to procure this number of oxen in order to make a single airship," said Mr. R. Moritz before the Royal Commission on Awards. He was appearing for Messrs. Vickers Ltd., who made a claim in respect of an invention by which the number of skins required was greatly reduced.

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The month of June, 1921, was the driest June we have had for over 100 years.

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The Chief Constable of Cornwall (Lt.-Col. Protheroe-Smith) has traced an outbreak of sheep scab in the county to grass purchased at Quethiock as long ago as 1917, and taken over the border into Devon. As a result the disease was re-introduced into Cornwall by sheep bought in Devon a few months ago.

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A valuable cow belonging to the Wharton Hall herd became entangled in a strewing machine recently, and, dashing about wildly, she fell into the river Eden, with spikes of the machine stuck in her throat and body. Her horns had to be sawn off before she could be extricated.

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*Cow killed by an Adder.*—The extremely poisonous nature of the adder's bite has again been demonstrated in Ardnamurchan. Last week three cows, the property of Messrs. M'Donald, Kilchoan, were bitten by one of these reptiles on the same day, and so strong was the virus that, despite the application of every reputed remedy, one of the cows succumbed to the poison. The others are slowly recovering. From the fact that the three cows were all bitten on the udder, and on the same day, it is conjectured that it was the work of one adder, which, judging from the powerful effects of its poisonous bite, must have belonged to the largest species native to the Highlands.

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Sir Arthur Boscawen informed Sir R. Newman in the House of Commons that eleven thoroughbred yearlings were sold at Newmarket on 29th June from the National Stud. The average amount for which they were sold was 2,410 gs., and the total amount realised was £26,520.

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Aberdeen-Angus on Top.—A lengthy and heated correspondence took place earlier in the present year regarding the respective merits of the Aberdeen-Angus and the Hereford as beef cattle. In a moment of weakness, inspired, probably, by an overanxious desire to "boost" the Herefords, certain champions of the "white faces" went so far as to claim for them that they were the premier beef breed. As might have been expected, the challenge was promptly taken up by the Angus champions, and, if we may say so, the latter had the better of the argument. Now the Angus men may be pardoned for claiming added support for their views in the results of the sale of the select draft of Alberta-fed beef cattle at Glasgow last week. The draft included seven Herefords and half a dozen Aberdeen-Angus. The average realised for the seven Herefords was £52 18s. 7d., and for the six Aberdeen-Angus steers £57 13s. 4d. Calculated per lb. live weight, the Herefords worked out at 7.10 pence, while the Aberdeen-Angus averaged 9.09 pence—a difference of almost twopence per lb. live weight, to say nothing of the carcase returns. It is ill to get past the Angus as a beef-producer!—*North British Agriculturalist.*

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Mr. James Spruell, Senior Veterinary Officer for the Transvaal, has been appointed Senior Veterinary Surgeon of the Cape. Mr. F. Hutchinson, who has been acting for Mr. Spruell, has been appointed Senior Veterinary Officer for the Transvaal.

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Although a policy of the closest economy has been imposed upon all Government Departments, and it has been found necessary to abandon many schemes of interest and value, the policy of improving the live stock of these islands still receives a measure of support; and for the financial year now opening (1921-1922), it has been found possible to allocate a sum of £35,000 for use in England and Wales. Of this amount £18,000 is set aside for grants for bulls, £7,800 for Milk Recording Societies, £7,250 for heavy horses, and £3,000 for boars.

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### The Sheep-Shearing.

Millet has painted it and Hardy has described it once and for all; but each sheep-shearing has its distinctive features.

Here is the great barn, with its gleams and glooms. In the darkest end are the sheep, huddled in their pens, or fidgeting and jerking as some new episode in what they must think of as the tragedy going on outside calls forth a new terrible sound. One thinks of *The Death of Tintagiles* as one looks into their beautiful frightened eyes. And here, in the lightest spot by the open door and the window, and the two sheep-shearers, with Jack, the under-shepherd, standing by, and tied in the corner, now sulkily still and now madly straining at his chain, is his very mongrel dog.

The chief shearer is old and tall and lean. His stubbly face is all seamed and wrinkled; and his kindly little eyes glitter. If you look at the muscles of his thin brown forearm, you can understand how he is able to go on opening and closing the shears, hour after hour, and guiding them so that the thick, matty wool is shorn close to the pink skin, and when the work is done the ridges on the sheep's back are as regular as if they had been measured. His strength and skill are marvellous. See him grasp a sheep, wrestle with it, throw it. He is kneeling now astride it, with one leg firmly planted between its fore-legs; and somewhere from under his boot a straitly confined but never throttling neck pushes out a pathetic, silly face. He is ruthless, but he is tender. Lie still, and you will not even be scratched. But kick and wriggle and the shears may snip an inch of skin at some heaving corner; and for certain you will feel again that gentle, inevitable strength smothering you down into helplessness.

He is Fate. We do not know what he is at. We only know that he is too strong for us. We hope that he may be benevolent; but, if he is not, still it is no use wriggling and kicking. He is stripping us of something. We feel mighty naked and cold when he has done with us. But let us hope that it is all for our good.—*A "Times" Correspondent.*

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*Canadian cattle coming.*—With the object of furthering the development of the cattle trade between Canada and the United Kingdom, a number of the ships of the Canadian Government Merchant Marine, Limited, running between Canada and this country, are being fitted out for the carriage of deckloads of live cattle.

The steamers Canadian Commander and Canadian Raider have both sailed from Montreal for Birkenhead with deckloads of cattle.

While the embargo against landing Canadian store stock cattle exists the shipments on board all ships will be slaughtered within ten days of the date of landing.

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### Breeding from Fillies.

Carried to its extreme practical limit, the principle of early breeding means mating a filly at two years old, and this practice is in quite common vogue, more especially among breeders of cart horses, to

which class of horse it is in particular applicable. Light horse breeders do not favour it to anything like the same extent, although cases in which two-year-old fillies of light breed are put to the horse are by no means infrequent. While the system is common enough, says the *Live Stock Journal*, some difference of opinion is found to prevail among breeders regarding the question whether it is advisable to breed from fillies at two years old. There are some who contemn such early breeding out and out, contending that a filly is still too immature at that age, and that being put in foal so early has a detrimental effect upon her, and is apt to interfere with her further development. That two years old is a very youthful age cannot be denied, but this does not necessarily imply that it is too young an age at which breeding may be commenced, and under favourable conditions no harmful results are likely to accrue when a filly, especially one of cart-horse breed, is bred from thus early. It is safe to conclude if the practice really involved undesirable effects it would not be so commonly resorted to by experienced breeders as is usually the case.

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### The Value of the Agricultural Show.

The agricultural show has been a factor of high importance in the successful development of the business of stockbreeding in the United Kingdom. It has not been devoid of blemishes, as when undue freedom has been allowed for the humouring of the fancy element in types and strains and, perhaps, in the encouragement it extends to high feeding; the system certainly has the defects that are often associated with distinctive merits. Prudent regard for the lasting as distinct from the temporary welfare of the stockbreeding interest, however, has sufficed to keep the adverse influences of public competitions in such moderation as to be no serious offset to the great advantages that have accrued. At different intervals during the past three or four decades an outcry has been raised against the tendency of the showyard to stimulate or perpetuate one defect or another. The complaints have not always been inspired by the same motive, but the general effect has been entirely good, and that was, if there were any justification for the protest, to check departure from the path that leads towards the fulfilment in the fullest sense of the best interests of the industry and the country. There is proof of this in the undeviating adherence to traditional type and utility in the many breeds of animals. There has been no idea or trace of stagnation, of clinging undiscerningly to fixed standards; the aim has been to maintain established breed characteristics as firmly as may be compatible with the development of utility properties in conformity with the requirements of the time. The breeds of to-day may differ in some respects from their ancestors of a few decades ago in some outward features, but the fundamental characteristics are as well defined as ever, and what changes have been brought about in symmetry, markings, and bearing, are usually indicative of advance in a safe direction and for some useful purpose. The influence of the showyard is powerful in whatever sense it is employed, and consequently it is essential that a close watch should be kept for any suggestion of departure from the correct path, accidental or intentional. The fact must ever be borne in mind that utility is the main consideration in all breeds, and that the show will defeat its primary purpose if fancy be allowed to override the qualities that make for economic fulfilment of aims that direct and sustain all enterprise. The show system as it has been developed and managed in this country gives little cause for serious criticism, while its influences have been of untold benefit to manifold interests, and may be said to have made the reputation of British live stock what it is, the greatest in the world.—*The Field.*

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### Sawdust as Cattle Feed.

An editorial in *Hoard's Dairyman* says: "The past year or two the Wisconsin Experiment Station has been treating sawdust chemically and making it a nourishing cattle feed. No doubt certain sections of the country could use this feed, if it could be purchased at reasonable prices. It should be remembered that sawdust untreated is worthless. The result in feeding sawdust in combination with high protein feed at the Wisconsin station has been satisfactory, but it is rather early to say whether it will ever become a feed generally used in the United States." — *Journal American Veterinary Medical Association.*

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## Correspondence.

**Letters to the Editors should reach the Office not later than by the first post on Tuesday morning for insertion in following Saturday's issue**

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### Annual Fee, R.C.V.S.

Sirs,—From letters I am receiving it appears that quite a number of members are under the impression that their names will be "struck off the rolls" if the annual fee is not paid, and many are refusing to pay, or are paying "under protest," because, to use the most common argument, they have paid their college fees and have earned their diplomas, and object to any threat to take away their rights from them.

May I say that any such impression is entirely erroneous? The Council has no power under the Amendment Act of 1920 to remove the names of non-paying members from the roll. Indeed, it sought no such powers. It has the power to sue for the fee in a county court, but I refuse to believe that the Council will ever have to adopt that course. Members of the profession are, I am sure, too loyal not to be willing to contribute to the funds of the college of which they are members when they realise how important it is that the Council, which they elect to carry on the affairs of the profession, should be supplied with the necessary means to carry out their duties.

I should like to take this opportunity of pointing out that the fee is only payable by members *in practice* in the United Kingdom. Any member who is not in practice as a veterinary surgeon should inform me, when a mark will be inserted in the Register to that effect opposite his name, and he will not be called upon to pay the fee. If any such member should decide to resume practice, on informing me the mark will be removed, and he will then,

of course, be liable for the payment of the fee annually.—Yours faithfully, FRED BULLOCK, *Secretary*.

Royal College of Veterinary Surgeons, 10 Red Lion Square, London, W.C.1, *2nd August*, 1921.

### Uterine Amputation.

Sirs,—In reply to Mr. T. C. Fletcher's communication in your issue of yesterday's date, I will endeavour "to enlarge upon my *modus operandi*" for amputation of the uterus, as he desires.

I purposely avoided doing so in my original article, for fear of criticism in an opposite direction.

Referring to my use of "the bottle," I would like to state that I have adopted this procedure for a period of thirty years, and in 75 per cent. of cases with success, in many instances after neighbouring practitioners have advised slaughter, as the cases appeared to them hopeless.

I would point out to Mr. Fletcher that, owing to the shape of the neck of the champagne bottle its pressure *does not*, as a rule, cause inconvenience, or heaving, and can usually be removed after twenty-four hours, when it will be found that the *os uteri* has so contracted that it requires quite a steady pull for its removal.

The removal of the uterus appears to me to be a very simple and successful operation to save life only, and I proceed as follows:—

Cast the animal and administer a general anæsthetic, then thoroughly cleanse the uterus and labia of the vagina with solution of chinosol or profluvine for some distance around the site of operation. Now apply a fairly stout and strong ligature, by means of two half hitches, around the neck of the uterus as close as possible to the labiæ, and when satisfied that no other organs or structures are involved, pull the two ends of the ligature as tight as possible, leaving the ends about 10 inches long. Then, with a sharp amputation knife remove the body of the uterus by an incision about one inch from the ligature. It will be found that the incised end readily recedes into the pelvic cavity.

The only after treatment which I have found necessary is to well syringe the vagina *twice daily* with a pint of tepid solution of one of the above-named drugs.

It *may* be necessary to tighten the ligature about the third or fourth day, which can readily be done by securing the ends (one of which must have a knot tied, as if pulled across it will loosen instead of tighten the knot), and give a steady pull.

If symptoms denote their use, chloral hydrate, tr. aconite (Fleming's), and æther. sulph. may be administered.

I have performed this operation with success on the sow, ewe, and cow for some years past.—Yours faithfully, J. C. COLEMAN.

The Limes, Croft Road, Swindon, *July 31st*, 1921.

### Army Veterinary Service.

LONDON GAZETTE.—WAR OFFICE.—REGULAR FORCES.

July 26th.—R.A.V.C.—Temp. Capt. J. T. Angwin relinquishes his commission on completion of service (May 16th, 1919), and retains the rank of Capt.

TERRITORIAL FORCE.

July 26th.—W. J. Leyshon to be Lieut. (July 14th).

### Diseases of Animals Acts, 1894 to 1914. Summary of Returns.

| Period. | Rabies. Cases Confirmed. Dogs. | Rabies. Cases Confirmed. Other Animals. | Anthrax. Outbreaks confirmed. | Anthrax. Animals attacked. | Foot-and-Mouth Disease. Outbreaks confirmed. | Foot-and-Mouth Disease. Animals slaughtered as diseased or exposed to infection. | Glanders (including Farcy).* Outbreaks reported by the Local Authorities. | Glanders (including Farcy).* Animals attacked. | Parasitic Mange. Outbreaks reported by the Local Authorities. | Parasitic Mange. Animals attacked. | Sheep Scab. Outbreaks reported by the Local Authorities. | Swine Fever. Outbreaks confirmed. | Swine Fever. Swine slaughtered as diseased or exposed to infection |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GT. BRITAIN. | No. | No. | No. | No. | No. | No. | No. | No. | No. | No. | No. | No. | No. |
| Week ended 23rd July, 1921 ... | ... | ... | 8 | 15 | ... | ... | ... | ... | 25 | 45 | ... | 21 | 10 |
| Corresponding Week in 1920 | ... | ... | 7 | 9 | ... | 4 | ... | .. | 47 | 61 | 2 | 18 | 11 |
| Corresponding Week in 1919 | 1 | ... | 6 | 7 | ... | ... | ... | ... | 56 | 102 | ... | 76 | 26 |
| Corresponding Week in 1918 | ... | ... | 4 | 4 | ... | ... | ... | 1 | 83 | 135 | ... | 31 | 23 |
| Total for 30 weeks, 1921 ... | 32 | 1 | 318 | 392 | 41 | 2888 | 7 | 12 | 1637 | 2556 | 399 | 788 | 255 |
| Corresponding period in 1920 | 4 | ... | 251 | 302 | 66 | 8337 | 10 | 17 | 2871 | 4864 | 289 | 1297 | 506 |
| Corresponding period in 1919 | 122 | 3 | 115 | 152 | 19 | 1033 | 15 | 41 | 3758 | 7304 | 218 | 1296 | 564 |
| Corresponding period in 1918 | ... | ... | 155 | 174 | ... | ... | 23 | 64 | 3229 | 6146 | 246 | 876 | 346 |

NOTE.—The figures for the current year are approximate only. *Excluding outbreaks in Army horses.

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IRELAND. Week ended 23rd July, 1921... | | | ... | ... | ... | ... | ... | ... | Outbreaks 3 | 1 | 7 | 18 |
| Corresponding Week in 1920 ... | | | ... | ... | ... | ... | ... | ... | ... | 6 | ... | ... |
| Corresponding Week in 1919 ... | | | ... | ... | ... | ... | ... | ... | 2 | ... | 1 | 2 |
| Corresponding Week in 1918 ... | | | ... | ... | ... | ... | ... | ... | ... | ... | 2 | 3 |
| Total for 30 weeks, 1921 ... | ... | ... | ... | ... | 7 | 77 | ... | ... | 60 | 153 | 55 | 300 |
| Corresponding period in 1920 ... | | | 1 | 1 | ... | ... | 1 | 3 | 78 | 164 | 6 | 22 |
| Corresponding period in 1919 ... | | | ... | ... | ... | ... | 1 | 1 | 112 | 158 | 20 | 63 |
| Corresponding period in 1918 ... | | | 2 | 2 | ... | ... | ... | ... | 81 | 182 | 14 | 48 |

NOTE.—The figures for the current year are approximate only.